



JSC employees are becoming Partners in Space, helping area teachers inspire their students. Story on Page 3.



It's always chili weather in Texas, and the Center Operations Directorate knows why. Photos on Page 4.

Space News Roundup

Vol. 29

November 9, 1990

No. 45

Duke, STS-31 crew earn AIAA awards

By Kelly Humphries

JSC's Dr. Michael B. Duke and the STS-31 crew will receive two prestigious American Institute of Aeronautics and Astronautics awards in January.

Duke will receive the AIAA's Space Science Award on Jan. 8 at the 29th Aerospace Sciences Meeting in Reno, Nev.

At the same meeting, STS-31 Commander Loren J. Shriver, Pilot Charles F. Bolden Jr. and Mission Specialists Steven A. Hawley, Bruce McCandless II and Kathryn D. Sullivan will receive the Haley Space Flight Award.

Duke, chief scientist in the Lunar and

Mars Exploration Program Office and former head of the Solar System Exploration Division, received the honor "for his inspiration and leadership in the advancement of scientific knowledge and human exploration of the solar system." The award consists of a medal, certificate and rosette pin.

The AIAA presents the Space Science Award annually "for distinguished achievements in studies of the physics of atmospheres of celestial bodies, or of the matter, fields and dynamic and energy transfer processes occurring in space or experienced by space vehicles."

The space flight award, named for

Andrew G. Haley, one of the founders of the American Rocket Society, is presented every other year "for outstanding contribution by an astronaut or flight test personnel to the advancement of the art, science or technology of astronautics."

The crew of the Hubble Space Telescope deployment mission was cited for "professionalism (that) has opened the door to new dimensions in science."

The crew is now part of a long list of JSC-based astronauts to receive the award. McCandless, who retired from NASA earlier this year, had already won the award once, in 1987. The crew

of STS-26, Rick Hauck, Dick Covey, Dave Hillmers, Mike Lounge and Pinky Nelson, received the award in 1989.

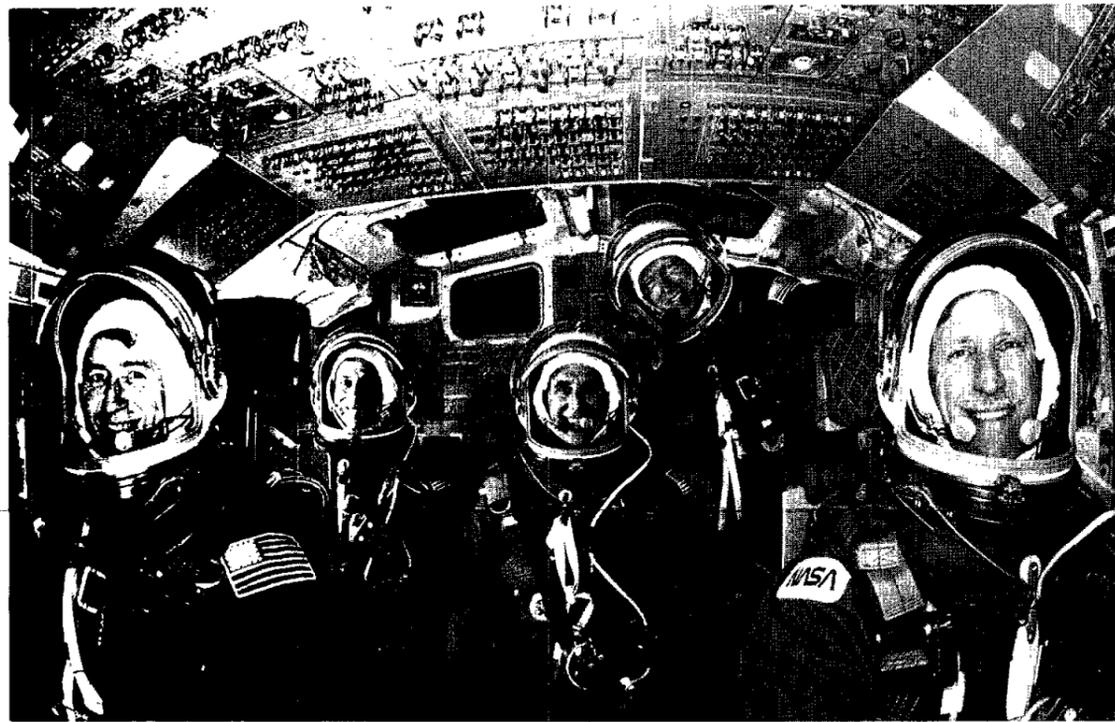
JSC Director Aaron Cohen nominated the JSC award winners.

"The aerospace community around here is to be congratulated for the extremely competent work being done," said John Trebes, 1990-91 chairman of the AIAA's Houston Section.

Trebes was especially pleased with the Space Science Award, the first to be earned by a JSC worker since Paul W. Gast in 1973. He said Duke "represents all of the good science being done" at JSC.



Michael B. Duke



JSC Photo by Bill Bowers

The STS-38 crew is wrapping up its training in hopes of a launch this coming Thursday. In the Shuttle Mission Simulator are, from left, Pilot Frank Culbertson, Mission Specialists Carl Meade, Bob Springer and Sam Gemar, and Commander Dick Covey.

Cargo problem solved; launch set for Thursday

By James Hartsfield

Atlantis, delayed a week due to problems with its classified cargo, has been cleared by managers for an STS-38 launch sometime between 5:30 p.m. and 9:30 p.m. CST Thursday.

"After we had set launch for Nov. 9, the payload folks discovered a problem they had to go work on as we were going through our normal tests in preparation for flight," Space Shuttle Director Robert Crippen said.

"They have done that and successfully solved their problem."

Crippen said *Atlantis*' processing is going well. "If the remaining scheduled work for STS-38 goes as planned and no unexpected obstacles arise, I'm confident that we will launch on Nov. 15th and that we'll be flying *Columbia* sometime in early December," he said.

The STS-38 crew—Commander Dick Covey, Pilot Frank Culbertson and Mission Specialists Bob Springer, Carl Meade and Sam Gemar—are scheduled to fly to Kennedy Space Center on Tuesday afternoon.

Meanwhile, a flight readiness review for *Columbia*'s STS-35 mission is scheduled for Nov. 26-27. An announcement of an official launch date should follow that review.

"Regarding *Columbia*, we're on a schedule that would, on paper at

least, support a launch as early as Nov. 30th," Crippen said. "However that is very quick after we plan to launch *Atlantis*. We usually use a three-week minimum between flights. We're going to ascertain what is reasonable, knowing what we do now about both vehicles, and find what the minimum turnaround time can be. If all of that plays together, we should be able to launch in at least the first part of December."

This week, standard work to prepare *Atlantis* for its impending launch has proceeded where it left off last week with close outs of the aft compartment, installation of two spacesuits in the airlock, purges of the three electricity-generating fuel cells on Thursday, and installation of ordnance devices today. The external tank also has been purged in readiness for fueling during next week's terminal countdown.

On Pad 39B, *Columbia*'s auxiliary power unit 1 was installed and a hot fire of all three APUs is planned for next week. In addition, one of the spacecraft's five on-board computers was replaced following a malfunction spotted during preparations for *Columbia*'s Oct. 30 tanking test. The Broad Band X-ray Telescope in the ship's payload bay was scheduled to be serviced with argon

Please see **ATLANTIS**, Page 4



Space station options study begins

Team to look at how new budget affects program

By Kyle Herring

A three month assessment of Space Station *Freedom* began this week to determine what program changes will be required in the wake of the recent passage of NASA's fiscal 1991 budget.

President Bush's fiscal request for space station was \$2.4 billion, but the approved budget allocates only \$1.9 billion for the program.

As a result, Space Station *Freedom* Program Director Richard Kohrs has formed a team to look at options and

determine what deletions or deferrals in content and what adjustments in schedules are necessary.

Associate Administrator for Space Flight William Lenoir said Wednesday that NASA currently "has \$6 billion more program planned than we have money for" based on the congressional language. "And that's our challenge, to take \$6 billion out of the program over the next five years and maintain a useful, affordable, desirable space station program."

The 90-day assessment, requested by Congress following passage of the NASA budget, is being performed within the existing *Freedom* organization, focusing at Level II with involvement of the Level III work package/project managers and contractors, international partners and the user community.

"Despite possible major changes in the program resulting from the restructuring," Kohrs said, "it is essential that

Please see **OPTIONS**, Page 4

High tide in sea change hits New Year's Day

By Brian Welch

"I think you have to focus a bit on what it is you do," my cousin Diane said during yet another of my whining sessions, "and not fool yourself into thinking that writing has any relationship at all to buying some rolled up weeds and setting them on fire."

My cousin has a way of making a point, hasn't she?

We were talking about smoking, of course, and writing, which is what I do for a living. Since this whole non-smoking adventure is still a new thing for me, I'm continuing the process of unlearning cigarettes. And right now I've got to unlearn the 18-year habit of smoking and writing.

Nicotine certainly never made my writing any better, but I've realized these last few days that cigarettes have always served as a crutch, as a part

of the ritual for focusing thoughts. This week, when there were a lot of deadlines to meet and the words weren't flowing, I began to think of what I was missing by not smoking, rather than focusing on the fact that with every passing hour, I am free of the entrapment. It's an extremely important point, because outlook is everything in this battle. I'm getting more and more confident that I'll make it, since after 18 days of abstinence the pride factor is beginning to kick in strongly. But I will tell you that it's not over yet.

There are triggers all around, and these are not always easy to get past. For instance, I resent having to endure

the sight of pack after pack of cigarettes at the checkout register when I buy groceries. Why can't we stick these things down by pet supplies and Drano?

There are other questions one might ask. I have to wonder, for example, about the NASA Exchange policy of retaining cigarettes in the vending machines around the center after Jan. 1. Look, I do not mean to

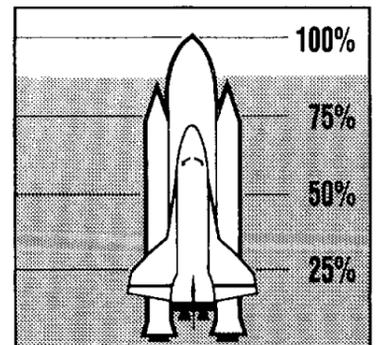
be one of those insufferable, self-righteous reformed smokers. Honest. But the sight and smell of cigarettes is physically painful and repulsive to me at this point. I would rather not have to see the cigarettes, and I'd be much happier if there were room

in the machines for more gum, more Tic-Tacs and maybe both kinds of Snickers bars.

The Exchange's policy is an effort to be reasonable, to approach a fundamental change with good will. But sooner or later, I believe, the concession of cigarettes is going to be seen as completely out of synch with center policy. What do we do then?

For seven weeks, this column has attempted with a bit of humor and honesty to draw some attention to the sea change our community is about to experience. We are moving toward a smoke-free environment. It's for real, and it's less than two months away. Now is a good time to readjust, because come January 1, 1991, the line will have been drawn.

Please see **SMOKERS**, Page 4



1990 GOAL: \$350,000



JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m. to 2 p.m. weekdays.

General Cinema (valid for one year): \$3.75 each.

AMC Theater (valid until May 1991): \$3.50 each.

Sea World (San Antonio, year long): adults, \$17.25, (2-day \$21.95); children (age 3-11) \$14.75, (2-day \$18.95).

Texas Renaissance Festival (Saturdays and Sundays, Oct. 6-Nov. 18): child, \$4.95; adult, \$8.95.

Dickens on the Strand: (Dec. 1-2, Galveston): child (6-12), \$2; adult, \$4; seniors, \$2. (Tickets go on sale Nov. 1).

Delta Downs Trip: (Nov. 17-includes transportation and admission to clubhouse): \$15.

Delta Downs Overnight Trip: (Nov. 17-18-includes transportation, accommodations at the Holiday Inn, admission to clubhouse, and buffet breakfast): \$55.

Christmas Tree Sale: (Nov. 13-28 purchase ticket to select a tree Saturday, Dec. 1): \$17.

JSC

Gilruth Center News

Sign up policy—All classes and athletic activities are first come, first served. To enroll, you must show badge or EAA card and pay at the Gilruth Center. Classes tend to fill up four weeks in advance.

EAA badges—Dependents and spouses may apply for a photo I.D. 6:30-9 p.m. Monday-Friday.

Defensive driving—Course is offered from 8 a.m.-5 p.m., Nov. 17, Dec 15, Jan. 26. Cost is \$15.

Aerobics and exercise—Both classes are ongoing.

Country and western—Next dance class begins Jan. 7 for beginners and intermediate. The six-week class meets Mondays. Cost is \$20 per couple.

Weight Safety—Classes will be Nov. 14 and Nov. 29.

JSC

Swap Shop

Property

Sale: Limestone County, 40 acre pastureland on paved road, fenced, ponds, barn, corral and catch pen, 2-2 mobile home, sell by owner, \$68K. 479-3965.

Rent: 1 week (Sat. to Sat.) Pagosa Springs, CO, Ski Wolf Creek and Purgatory, 2-2 house, sleeps 8, Jacuzzi, loaded, you pick wk., Jan. 5-Apr. 20, \$580. Scott, x34614 or 334-2278.

Sale: Lake Travis, 1.5 lots, Panoramic Hilltop View, \$10K. Anne, x31133 or 332-4383.

Sale/Lease: 3-2-2 home in Wedgewood Village, Friendswood, 1,650 sq. ft., new carpet/paint, cul-de-sac. 482-6744.

Sale/Lease: Baywind II condo, ground floor, 1 BR, W/D conn., FPL, \$365. 486-0898.

Rent/Lease: Baywind I condo, ground floor, 1 BR, new carpet/paint, \$395/mo. 690-4900, x116.

Sale: 3-2-2 brick home, LC, Brittany Bay, FPL, lg. MB w/shower, marble tub, \$74,950. David: 554-5514.

Sale: Seabrook townhouse, 1,400 sq. ft., 3-2-5-2C, \$22K. 333-7345 or 474-2339.

Sale: Friendswood, Mustang Meadows, 2.03 acres. 481-4187.

Sale: Hot Spring Village, Ark., wooded lot, util., improvements. \$13K. OBO. 333-6150 or 326-1254.

Sale: Kerrville, 12x60 mobile home, furn., good cond., CP, lg. cov. patio, \$7,500. 333-6150 or 326-1254.

Sale: Univ. Place, 2-story, 3-2-5-2, gas heat, FPL, corner lot, fern, near NASA, no pets. 282-5273 or 480-5361 or 488-0212/

Sale: Orlando, FLA retirement home, golfers dream, 2-2, den, Florida room, furn., w/Ethan Allen furn., includes golf cart on 18 hole course, \$49,900. 280-2523 or 333-1762.

Rent: Lake Travis cabin, priv. boat dock, CA and heat, equipped, accomm. 8, dly/wkly rates, \$80/\$325. 326-3652.

Sale: Univ. Green, 2-1-2 patio home, fen., new paint, vaulted ceiling, blinds, custom drapes, fans, FPL, deck, \$76K. 480-7338.

Sale: Galveston vacation resort/timeshare, \$12,500. 409-938-3171.

Rent: Galveston condo, Seawall & 61st St, furn., sleeps six, dly/wknd/wk rates, cable TV. x33479 or 486-3788.

Sale: Seabrook bayfront lot, \$125K; two water view lots near NASA, \$38.5K ea. Don, x38039 or 333-1751.

Lease: Prestigious Sageglen community, 4-2-2, ornal living/dining, new carpet/paint, new vinyl floor n kitchen/breakfast/bath. K.M., 484-1119 or 282-3229.

Sale: CL, Bay Glen Manor, David Weekly Newport, 3-2-2, quiet street, FPL, wet bar, fans, custom shades, professional maid & lawn care. Lindsay water treatment sys. negot., \$119K. 488-1441.

Rent: LC Oak Manor, 3-2-2 FPL, new paint & gray carpet, cov'd patio, fenced yard w/trees, 20'x20' garden, alarm, ceiling fans, frig, W/D, avail. Nov., \$750 + dep., no pets. x39230 or 332-3278.

Bay Glen 2 story, 3-2-5-2, alarm sys., marble FPL, eaded glass door, custom window coverings on all windows, fully guttered, workbench in garage, assum., \$122.9K. x39230 or 486-7106.

Sale/Lease: University Green townhouse, 3-2-2, ans, FPL, whirlpool tub, alarm sys., decked entry, 2 in. to JSC, \$92K or \$1100/mo. Dennis, x34405 or 180-5076.

Lease: Pipers Meadow, 3-2-2, fenced, vaulted ceiling, FPL, blinds, fans, od grill, \$850/mo. x38126 or 488-7094.

Sale: 4-2-5-2, Camino South, new carpet, backs up o golf course. 480-4502.

Lease: Galveston Bay waterfront, custom home, 2-1, block paneling and wood floors, decked three sides, enclosed and bulkhd, hot tub, gazebo, \$1,200/mo. 339-1562 or 333-6277.

Sale: Dickinson, 2 acres, Humble Camp Rd., mproved property, all utilities avail., nice trees, \$125K er acre. Shelly, 333-7153.

Sale: Texas City, 2-1-1, den, dining & living rms, nclosed back porch, curbs, \$32.5 OBO. Shelly, 333-153.

Cars & Trucks

'77 Grand Prix, good cond., new trans./tires/radiator,

\$1,495, OBO. David, 282-3827 or 554-5514.

'84 Olds Cutlass Supreme, high mi., but ex. cond., \$2,350. Stan Goldstein, x34724.

'79 Buick Regal, 2-dr., \$1K. (409) 925-8301.

'69 TR6 OD, AC, reb. eng., low mi., ex. cond., \$4,500. x34818 or 480-8335.

'89 Olds Calais S, 2-dr., 5-spd., Quad 4 eng., FE3 suspension pkg., warr., loaded, \$9K. 470-8759.

'89 Suzuki Side Kick conv., 5-spd., 4 cyl., 4 WD, 14K mi., warr., \$6,800. Bob, x35390 or 332-3775.

'85 Toyota Cressida, ex. cond., \$6,950. Chris, 282-2667 or (409) 925-8593.

'81 Camaro Z28, good cond., low mi., loaded, \$3K, OBO. Lea, 333-7306 or (409) 925-6403.

'84 Chev. Cavalier, new struts, tune-up, AC, ex. cond., \$2,500. Debi, x33422.

'88 Ford Exp. auto., loaded, ex. cond., \$5K. Dionne, 488-7352 or 532-1214.

'79 Ford Fairmont, 4-dr., auto., AC, good cond., \$700, OBO.; '87 Chev. Cavalier, 4-dr., auto., 37K mi., ex. cond., warr., \$4,600, OBO. x39579 or 482-6187.

'89 Acura Legend 'L, 4-dr., auto., warr. Mark, 485-6251.

'87 Pontiac Gran Am, auto., 4-dr., low mi., \$6,150. Jim, x36588 or 358-9598.

'83 Jeep CJ7 Renegade, 5-spd., 6 cyl., 61K mi., ex. cond., \$5,300. Clarence, x37160 or 486-5450.

'85 Buick Electra Park Ave., 4-dr., 70K mi., ex. cond., \$6,800. David, 334-2766.

'85 25' Road Ranger travel trlr., self contained, full bath, \$5,500. 644-4646 or 980-0123.

'83 Ford Bronco XLT, auto/pwr str/cruise/air/pwr wnd, \$5,750. Cathy, 992-3302.

'78 Chevy Caprice Classic, 305-V8, auto, PS, PB, AM/FM, tilt, 4-dr, rebuilt engine and transmission, \$1,250. K.M., 484-1119.

'86 Ford Mustang, GT, 5.0L, V8, 5-spd, 3-dr, great cond., 40K mi., blue, alarm, 1 owner, records, \$6,800. x34362 or 532-1182.

'77 Chevy Monte Carlo, 350-V8, AC, AM/FM/cass., new tires/shocks, runs great, \$900 OBO. Mark, x37491 or 335-1494.

'83 Plymouth Turismo, 5-spd, 2-dr htdchk., ex. cond., 61K mi., \$2,900 OBO. Dennis, x34405 or 334-1505.

'88 Ford T-Bird TC, dk blue, standard, leather, all options, very clean, 26.5K mi., \$10,500. Rich, 480-2570.

'87 VW Vanagon GL, PS, PB, AC, 7 pass., ex. cond., \$7,900. Jim, 283-5705 or 728-9716.

'84 2-dr Cutlass Supreme, dk blue w/ tinted windows, \$3,500. 280-8000 or (409) 925-1791.

'88 Hyundai GLS, 5-spd, cruise, sun roof, AM/FM/ cass, AC, alarm, car cover, 56K mi., ex. cond, \$4,500. nego. Kne, 480-3728.

'77 Dodge Royal Monaco, second owner, AC, pwr, mechanics great, esthetics not so great, \$800 OBO. Gene, x38020 or 334-1505.

'74 Chevy Nova, 350 cu. in. V8, 4-dr, \$600 OBO. Manuel, x38326.

'85 Chevy Blazer, V6, auto., good AC, good tires, pwr locks/windows, cass., very clean, 63K mi., \$6,500. x31913 or 486-9488.

'85 Monte Carlo, silver and gray, 4.3L fuel inj V6, 76K mi., AM/FM/cass, AC, PS, tilt, cruise, pwr locks, runs ex., \$4,500 OBO. Dennis, x39012 or 554-4233.

'87 18' Celebrity Bowrider, 165hp I/O, deep V hull, stainless prop, galv. trlr. w/spare, ex. cond., \$8,800. 286-3626.

LIDO-14 sailboat, sails, trlr., cntrbd. sloop, loaded, ex. cond., sailing lessons incl. if needed, \$2,100. R. Hoover, x31360 or 996-7716.

Slalom ski 67" Ebonite Shuttle, ultra pro ski rope, anchor line, car, \$75, OBO; camper/boat hitch, draw-tite 3,500 lb. cap. hitch w/remov. recep., 2" chrome ball,

1 yr. old, \$100, OBO. 486-4963.

Mistral competition windsurfer, complete w/6.2 m sail, beginner, intermediate, \$500. Mike, 283-5890 or 280-9005.

'89 10' Bayliner Bowrider, 125 motor, trlr, always garaged, many extras, \$500 down and obtain a new load. x31294 or 280-8855.

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Today

Cafeteria menu—Special: tuna and noodle casserole. Entrees: broiled codfish, fried shrimp, baked ham. Soup: seafood gumbo. Vegetables: corn, turnip greens, stewed tomatoes.

Monday

Veteran's Day—Most JSC offices will be closed in observance of the Veteran's Day holiday.

Tuesday

SEPEC seminar—The Software Engineer Profession Education Center will present an "Overview of Real-Time Simulation" seminar at 8:30 a.m. Nov. 13 at the University of Houston-Clear Lake, Bayou Bldg., Rm. 1-311. The registration fee is \$35 per person per session (group discounts and special rates are available). For more information contact SEPEC, 282-2223.

Cafeteria menu—Special: fried chicken. Entrees: beef stew, shrimp creole, sweet and sour pork chop with fried rice. Soup: beef and barley. Vegetables: stewed tomatoes, mixed vegetables, broccoli.

Wednesday

NCMA banquet—The National Contract Management Association Houston Chapter will host its 23rd annual Educational Conference Nov.

14. The conference will include a Nov. 14 banquet featuring Harold Stall, JSC director of Public Affairs, at the Nassau Bay Hilton. A workshop will be held Nov. 15 at the Hobby Holiday Inn. Registration is \$100 for members; \$125 for nonmembers; and \$25 for the banquet only. Call Sue Garman, x35998, or Linda Frazier, 333-6389 for more information.

Astronomy seminar—The JSC Astronomy seminar will be held at noon Nov. 14 in Bldg 31, Rm. 129. Paul Maley will speak on the Mexico Solar Total Eclipse, July 1991. For more information contact Al Jackson at 333-7679.

Cafeteria menu—Special: Swiss steak. Entrees: fried perch, New England dinner. Soup: seafood gumbo. Vegetables: Italian green beans, cabbage, carrots.

Thursday

Nuclear Propulsion Conference—Astronaut Franklin Chang-Diaz will host a conference at 8:30 a.m. Nov. 15 at the Nassau Bay Hilton. For more information contact Matt Hines at x32814.

Club Amiga meets—The Clear Lake Chapter of Club Amiga will meet 7 p.m. Nov. 15 in Microsearch Computers at the corner of Space Center and Bay Area. For more information call Mike Kent at x33791

or 482-1279.

Cafeteria menu—Special: stuffed bell pepper. Entrees: turkey and dressing, enchiladas with chili, wieners and baked beans. Soup: cream of chicken. Vegetables: zucchini squash, English peas, rice.

Nov. 16

Health fair—The JSC Human Resources Office will sponsor a one-day Health Fair starting at 9 a.m. Nov. 16 in the Gilruth Center ballroom. Health care representatives will present their 1991 benefit packages to assist employees in making open season changes. For more information, call x32681.

"Right the First Time"—JSC's Human Resources Office is sponsoring a televised Boston University course on product development and concurrent engineering. The televised course will be at 1 p.m. on Nov. 16 on JSC's television network; watch the program guide for the correct channel. Cross-functional teaming is the topic. For more information contact Tim Johnson at x32604.

Cafeteria menu—Special: Salisbury steak. Entrees: baked scrod, 1/4 broiled chicken with peach half. Soup: seafood gumbo. Vegetables: cauliflower Au Gratin, mixed vegetables, buttered cabbage, whipped potatoes.

Property

Sale: Limestone County, 40 acre pastureland on paved road, fenced, ponds, barn, corral and catch pen, 2-2 mobile home, sell by owner, \$68K. 479-3965.

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Lease: Galveston Bay waterfront, custom home, 2-1, block paneling and wood floors, decked three sides, enclosed and bulkhd, hot tub, gazebo, \$1,200/mo. 339-1562 or 333-6277.

Sale: Dickinson, 2 acres, Humble Camp Rd., mproved property, all utilities avail., nice trees, \$125K er acre. Shelly, 333-7153.

Sale: Texas City, 2-1-1, den, dining & living rms, nclosed back porch, curbs, \$32.5 OBO. Shelly, 333-153.

Cars & Trucks

'77 Grand Prix, good cond., new trans./tires/radiator,

\$1,495, OBO. David, 282-3827 or 554-5514.

'84 Olds Cutlass Supreme, high mi., but ex. cond., \$2,350. Stan Goldstein, x34724.

'79 Buick Regal, 2-dr., \$1K. (409) 925-8301.

'69 TR6 OD, AC, reb. eng., low mi., ex. cond., \$4,500. x34818 or 480-8335.

'89 Olds Calais S, 2-dr., 5-spd., Quad 4 eng., FE

Giving Kids Some Space

Teachers learning how today's lessons may be applied tomorrow at JSC



By Billie Deason

In a turn-about of roles, JSC engineers are taking their work experiences back to school following an education workshop sponsored by Partners in Space.

Partners in Space, a local organization formed to strengthen the relationship among JSC, business, education, research and technology entities in Texas, has dedicated an Educational Resource Center to improve the effectiveness and efficiency of business/education partnerships.

A summer workshop entitled "Give Your Kids Some Space" invited JSC and aerospace industry technical workers to collaborate on curriculum enrichment with area teachers. Mathematics and science teachers from grades 6 through 12 heard about today's industry applications of the classroom subjects.

About 25 JSC employees participated in the two-day session. The gathering was informal, with teachers encouraged to describe their needs to make class material more interesting. Technical people circulated among teachers, sometimes in one-to-one discussions, other times in larger groups.

Mindy Cohen, an engineer in the Schedules and Flow Office of Mission Operations Directorate, described her pleasure in finding 40-odd math and science teachers "dedicated and excited about their work."

"We had been told we'd be meeting with science and math teachers from 6th to 12th grade and to come up with a couple of math or science problems they could use in the classroom. But our time with the teachers blossomed into much more. Teachers asked us 'What do you do in your work every day?'"

"Through our discussions, the teachers learned there are actually people at NASA who design schedules for products to get onto a shuttle and other people who compute time schedules for the astronaut crew," Cohen said. "For some teachers, just that information was enough for them to go back to the classroom and say 'I met people from NASA this summer, and did you know they do this kind of job?' Other teachers might use the mission timeline in a lesson on budgeting time, instead of the classic money budget problems. Besides, time management skills are as important for students as money management skills."

Earlier this year, Cohen served on a committee evaluating 6th grade science textbooks to be used for the 1991 school year.

"I had a bit of a head start on what teachers have to work with in terms of the classroom resource material. When I talked with the 6th grade teachers, we had a real match in background information. I was more aware of the difficulty teachers face in covering a subject given the time allowed," said Cohen.

Motivating the students was a recurring concern among all the teachers at the workshop who represented several levels of math and science classes, from basics through honors courses.

"Some teachers told us their students were

interested in everything and any information about our jobs would be helpful," she said. "Others said 'I have kids who think they don't need math for anything. What can I do to motivate them?'"

"We brainstormed ideas that might help jump start these kids. It's sad, by eighth grade, some kids have decided they don't want to do anything with math ever again."

The need for methodical, organized problem solving skills was another topic discussed.

"Some of my co-workers told the teachers to 'get your kids to organize their notes because we need people who are organized thinkers,'" Cohen said. "We definitely apply those skills. For example, people who work on our flight control teams must be able to quickly locate critical information. Since we can't keep everything in our heads, we have to keep resource documents at our fingertips. Also, flight controllers must take accurate and complete log notes because the other team members depend on that information when they come on duty for their shifts."

The JSC workers also emphasized the value of writing skills in their everyday work.

"I stressed, please get your students to write," she said. "Writing is required in every professional category, and we'd sure appreciate it if people wrote better. I was pleased to hear from over half the science teachers that they give essay questions to their students."

Mark Ferring, an aerospace engineer and chief of MOD's Environmental Systems Section, credits his career progression to teachers who insisted he master writing skills in addition to math and engineering courses.

"We spent the two workshop days rotating among all the teachers so they could be exposed to all of us," Ferring said. "The teachers' goal was to learn more about the technical work carried out at JSC. They all work close to our facility, but don't feel too connected to it."

At the conclusion of the workshop, JSC and industry participants were asked to volunteer for further activities with teachers.

"Partners in Space paired me with Rick Foulk,

a biology teacher at Friendswood High School. I found Rick really inspirational. I remember some high school teachers like him. Friendswood students really line up for his classes," Ferring said.

Foulk accompanied Ferring through a typical work day at JSC.

"I tried to make it an interesting day," he said. "We began by attending a staff meeting so he could see that all organizations have to deal with administrative chores."

"Then he stayed for our systems issues meeting. (Ferring's section looks after shuttle life support systems.) Interestingly enough, we talked about training, how we can better train our people, and Rick actually got into the discussion."

"He really enjoyed that session and thought it was neat that he could provide some comments to what we were doing. He saw how there is a practical connection between what happens inside NASA and his arena."

"Later, Rick heard a briefing on some of the biological systems we're planning for the extended duration orbiter. We're helping design a device that scrubs carbon dioxide from the cabin air. Since he's a biologist, I thought he'd be interested to know how we go through the design process."

Foulk's day ended with a full-up demonstration of a new computer system being developed to research previous flight data and overlay the archived information onto real-time flight data to speed problem resolution.

"Rick got in line with all the other guys after the demo and asked questions about the system just like he'd been working here for five years," Ferring said.

Ferring thinks the initial usefulness of teacher-industry partnerships is for students to gain a realistic view of actual work situations.

"Students need to recognize that the people here are not superhuman," he said. "We were all high school students just like today's

students are. We're not all geniuses, we were not all at the tops of our classes in high school.

"We are people who simply have an interest and a vision of what we want to do. We want to look back upon our lives and realize that we've invested energy in a career that is personally satisfying."

"I tried to show Rick Foulk that it isn't necessarily someone's innate talent that makes him successful, it's his motivation."

In college, Ferring thought he would not qualify for a NASA job. But a friend at JSC encouraged him to apply.

"Once I recognized it was possible to get on at JSC, I worked very hard to make that happen," he said.

"If we can share these messages with educators, they can convey the same message to students when we're not around."

Rick Barton, chief of Engineering's Aerospace Branch, struck a similar chord.

"Another asset is we're real people, too. Some people think you're some sort of oddball if you're an engineer or a mathematician," Barton said. "We can help students see how their school classes apply to the real work world."

"We talked with the teachers about the sort of things we do daily and how we use math and science in our work."

"We had a good response from the teachers. A group of them came to our offices and we put on a special computer demonstration," Barton said.

Susan Graham, an honors math teacher at J. Frank Dobie High School, spent a full day with Barton. Graham sat in on the weekly group meeting where Barton's engineers updated him on project activities. Graham asked many questions about each project, then met with individual engineers.

"We talked with Susan about what kind of math-related problems we encounter in our work and how we use math every day," said Steve Fitzgerald, one of the engineers in Barton's branch. "Susan was most impressed with our computer graphics program applied to computational fluid dynamics. She was very interested in the pure math and pure physics applications we use."

Barton's organization is developing a plan to allow selected students controlled access to some of the computer programs his engineers use.

"We have discussed maybe setting up some applications problems for the students to solve," he said.

Barton has a special interest in education. His mother, one brother and two sisters all have been teachers.

"Maybe my interest in education is inborn," Barton said. "It's important to me to see the young people coming up through the education system. I have been involved in training cooperative education students in engineering programs over the years."

"I thought this was a good opportunity to work with high school students getting them started toward engineering or of skills learned in the classroom."

The resource center is planning further partnership activities that would bring technical workers into the classrooms for sessions with students.

Susan Spencer, director of the Partners in Space educational resource center, said the group is anxious to put in place the best methods to get teachers in touch with the great resource of technical knowledge in the aerospace community and to bring those experts into the education process. "Our priority right now is to find out exactly what will best serve teachers," she said.

Spencer is working with the four school districts within the service region to determine the programs for 1991. The Educational Resource Center will be officially dedicated at a banquet slated for Feb. 17, 1991.

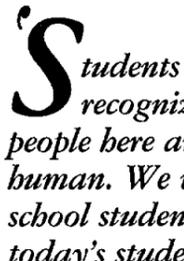


Top: Dr. Grace Grimes of the Texas Education Agency speaks to the Partners in Space teacher-industry workshop at the Nassau Bay Hilton. Teachers from the Clear Creek, Pasadena, LaPorte and Friendswood school districts met with JSC employees and other aerospace workers to discuss ways of inspiring students to jump into the learning adventure. Above: A Pasadena high school teacher talks with Donna Moloy of Lockheed center, and Ronnie Lanier of JSC's Mission Operations Directorate Training Division, right.



'We brainstormed ideas that might help jump start these kids. It's sad, by eighth grade, some kids have decided they don't want to do anything with math ever again.'

—Mindy Cohen



'Students need to recognize that the people here are not superhuman. We were all high school students just like today's students are.'

—Mark Ferring



NASA, TADCORPS to share closed loop systems research

NASA and the Technical and Administrative Services Corp. (TADCORPS), Washington, D.C., have agreed to exchange research information on closed environment systems related to food production on Earth and in space.

NASA and TADCORPS have mutual interests in the development of

hydroponic technology for possible microgravity and partial gravity life sciences support. NASA is interested in exploring controlled environment systems and hydroponics technology to develop the food production systems necessary to sustain crew members on long-duration space missions such as establishment of

lunar communities or an expedition to Mars. The agency also is interested in chemical processes associated with waste recycling and management.

TADCORPS is exploring concepts for test facilities that could be applied to domestic crop enrichment in hostile environments in remote regions of the

world.

The two-year agreement, which involves no money, provides for NASA and TADCORPS to share information generated from studies in three areas:

- Potential development of hydroponic systems and agricultural experiments and uses aboard the space

shuttle and Space Station *Freedom*;

- Potential chemical processing technology in support of life support and hydroponic systems; and
- Possible terrestrial applications of closed environment systems and hydroponic technology through fixed and deployable hydroponic test facilities.

Quality award nominations due next month

Nominations are being accepted for the JSC Quality Partnership Award, which is being reduced in frequency from quarterly to twice a year.

The award, presented since 1988 by the Safety, Reliability and Quality Assurance Office, recognizes individuals and teams outside SR&QA that play key roles in helping employees and contractors reach a common goal of excellence.

Nominations should be submitted to the Quality Assurance and Engineering Division, Code ND, by the candidate's peers or managers. Nominees may not work for SR&QA or the Houston-based prime contractor, Loral Space Information Systems.

Deadline for nominations is Dec. 31. The award will be presented in January. For more information, call M. Conley Perry, chief of the Quality Assurance and Engineering Division, x34352.

The most recent recipients were three Barrios Technology employees, James White, Patrick Walter and Jeanne Rash, who developed the NASA Excellence Award Data Systems as a quality and productivity tracking tool.

Roundup sets holiday deadlines

Because of the Thanksgiving, Christmas and New Years Day holidays, Space News Roundup will not be published Nov. 23 or Dec. 28. Some deadlines will be affected.

The deadline for Swap Shop ads to be published Nov. 30 will be 5 p.m. Wednesday, Nov. 14. The deadline for Jan. 4 Swap Shop ads will be 5 p.m. Wednesday, Dec. 19.

The deadline for receipt of information to be published in the Nov. 30 Dates and Data calendar of events will be 5 p.m. Wednesday, Nov. 21. The deadline for receipt of information for the Jan. 4 Dates and Data section will be 5 p.m. Wednesday, Dec. 26.



CHILI TODAY — Almost 2,000 people attended this year's Center Operations Directorate Chili Cook-off at the Gilruth Center. Above: Taking a stab at the showmanship award is the Frontier Chili team. Right: Bob Walck, the cook for the Showtime Chili team, stirs his crew's caustic brew. Showtime Chili defeated 15 other teams to win first place in both the Judges' Choice Chili and Showmanship competitions, said Chairman Ginger Gibson. El Diablo Chili won the People's Choice award. The Worst Chili award went to Upchuck Chili.



JSC Photos by Mark Sowa

Magellan images imply engulfing molten rock flow

The Magellan spacecraft has found evidence that oceans of molten rock may have inundated half the surface of Venus at one time.

NASA's Jet Propulsion Laboratory scientists said they don't yet know if there was one great outpouring of lava or a series of smaller flows, each hundreds of thousands of square miles, that engulfed parts of Venus at different times.

Steve Saunders, Magellan's chief scientist, said he favors the theory that the lava rose out vents in a global set of eruptions about 400 million year ago, but that there also is evidence of continuing activity.

"We're beginning to get a picture of a planet here that's in almost constant motion and fractures are forming and reforming everywhere," he said.

The effects of the lava, which covers about 60 percent of the planet, are being deduced by studying the many impact craters that are being destroyed by tectonic activity, Saunders said.

Saunders said he began to suspect Venus was subject to such catastrophic volcanic activity because Magellan's pictures of Venus show the planet has fewer large meteorite impact craters than Earth's moon, and because "the ones we find are all relatively fresh."

That suggests "there's a process of very widespread volcanism that occurs from time to time that destroys all the craters — and everything else," he said.

Magellan, after more than 650 orbits 3,948 miles above Venus, is expected to resume full communication with Earth on Saturday. A superior conjunction of Earth and Venus, in which the two planets are on opposite sides of the Sun, has been blocking high data rate communications since Oct. 26. Low rate engineering data continues to show the spacecraft is in good health. The high data rate is expected to be working again Saturday.

Vehicle passes available

Requests for vehicle passes for 1991 space shuttle launches and landings are being accepted by the Public Services Branch.

The passes are issued to NASA and contractor employees on a first-come, first-served basis. A launch pass will permit the occupants of a standard-sized passenger vehicle, including vans, to view the launch from the NASA Causeway. All recreational vehicles, campers, trailers and buses will be accommodated at a designated area at the site and will require a special placard. No such distinction will be made for vehicle passes at Edwards Air Force Base landings.

Requests must be submitted in writing and include name, complete mailing address, phone number, the type of vehicle being used, the flight or flights requested, and whether a launch or landing pass is needed.

Instructions will be mailed with the passes about two weeks before launch. For more information, call x33276.

Options for Space Station *Freedom* construction being studied

(Continued from Page 1) any changes be against a solid baseline."

With that in mind, the team begins its review knowing that the on-going integrated system Preliminary Design Review will be completed on schedule at the end of this calendar year, Kohrs said.

A set of ground rules was developed as a template from which the team can start. The team will use these rules to establish recommendations for immediate and long-range

implementation of the program.

The ground rules, in no specific order of importance, are:

- Limit assembly flights to no more than four per year.

- Assume 10 percent growth in the program's budget above the previous year until reaching the \$2.6 billion ceiling. Congressional language states that *Freedom* budget growth over the next several years would be no greater than 10 percent above the previous year.

- Develop a phased approach

including man-tended capability and utilization; power increments of approximately 18.75 kilowatts up to a total of 75 kw; habitation module and man systems; permanently manned utilization (four person crew); international modules; and an eight person crew capability. Additional phases could be added following the assessment, as appropriate, for long-term consideration.

- Protect life and materials sciences as "high priority."
- Minimize impacts to international

partners, including hardware/software interfaces and schedule with a goal of maintaining the international agreements.

- Achieve First Element Launch in March 1995 or as early as possible.

- Achieve man-tended capability as early as possible.

- Maintain permanently manned capability as a program commitment.

- Simplify the design and assembly process, but use existing architecture, concepts and design as

much as possible.

- Identify all development that does not directly support the baseline configuration.

- Eliminate alternate management structures from consideration.

"If we cannot come up with what we consider to be a reasonable program that we think properly serves the highest two priorities," Lenoir said, "then we would have to readdress whether we should even go forward with the space station program."

Atlantis launch imminent

(Continued from Page 1) for cooling Thursday.

Work on *Discovery*, in Bay 1 of the Orbiter Processing Facility, has centered on the spacecraft's orbital propulsion systems this week. The forward reaction control system and the right orbital maneuvering system pod have been removed and are now in the Hypergolic Maintenance Facility undergoing checks and refurbishing operations. A new "screen test" designed to check the integrity of internal screens in the OMS propellant tanks, is slated to begin Monday.

Discovery's three main engines are to be removed today and transferred

to the engine shop in the Vehicle Assembly Building (VAB).

In the VAB this week, stacking operations have begun for the boosters that will be used on STS-39, currently scheduled to fly in late February 1991.

In other business, Crippen Wednesday said a new shuttle manifest may be published by the end of November. But rather than set dates as in past manifests, a window showing the earliest and latest possible launch dates will be issued. Also, for flights more than three years away, only a general month or quarter of a year may be announced as the launch time.

Space News Roundup

The Roundup is an official publication of the National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas, and is published every Friday by the Public Affairs Office for all space center employees.

Editor Kelly Humphries
Associate Editors Pam Alloway
Kari Fluegel

Smokers need support to quit

(Continued from Page 1)

And incidents like the one I witnessed in Bldg. 16 recently won't help. Some belligerent soul over there thinks it's humorous to keep pouring water into one of those large sand-filled ashtrays where smokers gather. One of the smokers vented his spleen by hanging a sign over the ashtray attacking such childish behavior. By the time I saw it, this sign had accumulated some interesting graffiti.

None of this is terribly helpful when there are people facing the rigors of quitting a nasty habit. I've told you about the despair of near failure and the

triumph of succeeding yet another day. It's been a watershed experience for me, but it has not been mine alone. My co-workers have shared the ups and downs. They have been wonderfully supportive and I can't help but believe we are no different than you and your co-workers in Mission Control, the printing plant, the Planetary Science Branch or wherever else JSC badges congregate to create the marvels of the American space program. With a little humor and a lot of courage on one side and as much compassion on the other, we'll get through this thing just fine. Together.